

Application Serial No: 10/644,574
In reply to Office Action of 29 July 2004

Attorney Docket No. 83046

AMENDMENTS TO THE CLAIMS

1. (Currently amended): An apparatus for enabling acousto-optic communication from water to air comprising:

an acoustic projector positionable below a surface of the water;

an optical interrogation beam transmitter to transmit an interrogation beam from the air toward the surface of the water;

an optical interrogation beam receiver to receive a reflection of the interrogation beam from the surface of the water;

an interferometer joined to said optical interrogation beam transmitter and said optical interrogation beam receiver to measure differences between said interrogation beam and said reflection of the interrogation beam; and

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a signal converter joined to said interferometer to receive
said measured differences and provide an electrical
signal corresponding to said measured differences; and

a signal processor joined to said acoustic projector to
provide a signal to the acoustic projector.

2. (Original): The apparatus of claim 1 wherein said optical interrogation beam transmitter is a laser.
3. (Original): The apparatus of claim 2 further comprising a beam splitter joined in communication with said optical interrogation beam transmitter and said interferometer, said beam splitter splitting off a portion of said interrogation beam to provide to said interferometer.
4. (Original): The apparatus of claim 3 wherein said interferometer is a laser Doppler vibrometer.
5. (Cancelled).
6. (Currently amended): The apparatus of claim [[5]] 1 wherein said signal is translated into a scheme selected from the group

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consisting of multi-frequency shift keying, M-ary phase shift keying, and M-ary quadrature amplitude modulation.

7. (Original): The apparatus of claim 6 further comprising a telemetry receiver joined to said signal converter to receive the electrical signal and translate the electrical signal back into the original signal.

8. (Currently amended): A method for transferring a signal from below a water surface to air above the surface comprising the steps of:

transmitting an acoustic signal below the water surface to
an acousto-optic interaction zone;

transmitting an optical interrogation beam from the air to
the acousto-optic interaction zone;

receiving a reflection of said optical interrogation beam
from the acousto-optic interaction zone;

comparing said transmitted optical interrogation beam with
said reflection to obtain interferences; and

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converting said interferences into an electrical signal;

providing a signal of interest below the surface prior to
said step of transmitting;

modulating said provided signal with one modulation
selected from a group consisting of multi-frequency
shift keying, M-ary phase shift keying, and M-ary
quadrature amplitude modulation; and

providing said modulated signal as said acoustic signal.

9. (Cancelled).

10. (Currently amended): The method of claim [[9]] 8 further comprising the step of demodulating said electrical signal to restore said signal of interest above the surface.

11. (Original): The method of claim 8 further comprising the step of splitting said transmitted optical interrogation beam into a first optical interrogation beam transmitted from the air to the acousto-optic interaction zone and a second optical interrogation beam provided as said transmitted optical interrogation beam for said step of comparing.